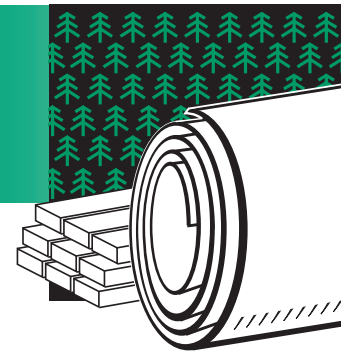


# FOREST PRODUCTS

## Project Fact Sheet



### CLOSED-CYCLE BLEACH KRAFT PULP PRODUCTION

#### BENEFITS

- Potential for energy savings up to 147 billion Btu per year for each new production unit with a capacity of 700 air dry tons
- Wastewater bleaching effluent savings per unit of approximately 11,150 tons per year measured as chemical oxygen demand
- Water consumption per plant could be reduced by as much as 875 million gallons (2.32 tons) per year
- Overall potential to save 67 billion gallons of freshwater per year by the year 2010 if half of industry adopts technology
- Eliminates toxic wastes discharged into local waterways near mills
- Eliminates potential worker and community safety hazards associated with chlorine or chlorine dioxide use

#### APPLICATIONS

A totally chlorine-free closed-cycle process can substitute for conventional chlorine or chlorine dioxide bleaching in Kraft pulp mills.

### NEW CHLORINE-FREE PROCESS FOR PULPING AND BLEACHING ELIMINATES BLEACHING WASTEWATER WHILE MAINTAINING U.S. COMPETITIVENESS

A new, totally chlorine-free process offers dramatic improvements to pulp and paper processing by eliminating discharged wastewater from the bleaching process, lowering energy costs, and eliminating the need for chlorine to bleach pulp.

Chlorine and chlorine dioxide are conventionally used with process water to bleach pulp. The process wastewater containing chlorinated pollutants and other contaminants is then discharged to the environment. The Louisiana-Pacific Corporation has developed a closed-cycle, totally chlorine-free (TCF) pulp processing technology for commercial use that will bring dramatic improvements to the pulp and paper industry. Louisiana-Pacific's system is being demonstrated at the Samoa Pulp Mill in northern California where it is eliminating the need to discharge and replace bleaching process wastewater from the mill.

Using approximately 1.5 trillion gallons per year, the forest products industry is currently the largest consumer of process water. In addition to its water consumption, the industry annually discharges about 330 billion gallons of bleaching wastewater into rivers and streams. Louisiana-Pacific's new closed-loop system will virtually eliminate these discharges and reuse the bleaching process water. If 50 percent of the Nation's mills convert to this technology, freshwater consumption could be reduced by 150 billion gallons per year. At this level of market penetration, application of the knowledge gained through this project could save the pulp and paper industry 9.4 trillion Btu of energy each year.

#### TOTALLY CHLORINE-FREE PULP PROCESSING



The totally chlorine-free process in place at the Samoa pulp mill brings dramatic improvements to pulp and paper processing that eliminate discharged wastewater from the bleaching process and lower energy costs.



## Project Description

**Goal:** Demonstrate a Kraft pulp mill that economically produces strong, bright, bleached market pulp with zero-bleach discharge from the plant and commercialize successfully a full-scale TCF closed-cycle Kraft pulp mill in the United States.

Building on recent closed-cycle research and development and mill experience, the project team engineered and implemented a new bleaching plant process that completely recovers bleaching wastewater. Hydrogen peroxide replaces chlorine and chlorine dioxide as the bleaching agent in this process. Unlike chlorine, noncorrosive hydrogen peroxide in wastewater can be recycled back into the process with significantly reduced risk of corrosion of machinery. The noncorrosive chemistry, along with controlled similarity of pH and temperature conditions between bleaching stages, makes economic recycling of bleaching wastewater possible. This closed-cycle operation contains foundation pollution prevention technologies, including digester cooking, oxygen delignification, a high-efficiency recovery boiler, and TCF bleaching.

High levels of bleaching wastewater recycling while producing market quality pulp without chlorine chemistry were significant milestones in the demonstration of this pioneering project. The goal for the near future is to improve bleaching process economics and restore production capacity to pre-project levels. This step is necessary to realize full energy and effluent flow reduction benefits. The project team has already identified further improvements necessary to realize this goal.

Louisiana-Pacific demonstrated this new technology with assistance from AGRA-Simons, the University of Idaho, the California Environmental Protection Agency, and the NICE<sup>3</sup> Program in the U.S. Department of Energy's Office of Industrial Technologies.

## Progress and Milestones

- Recycled and recovered 100 percent of peroxide stage filtrates.
- Developed spill prevention, energy management, metals management, and a regulatory reform data system.

## INDUSTRY OF THE FUTURE—FOREST PRODUCTS AND AGENDA 2020

In November 1994, DOE's Secretary of Energy and the Chairman of the American Forest and Paper Association signed a compact, establishing a research partnership involving the forest products industry and DOE. A key feature of this partnership was a strategic technology plan—**Agenda 2020: A Technology Vision and Research Agenda for America's Forest, Wood and Paper Industry**. Agenda 2020 includes goals for the research partnership and a plan to address the industry's needs in six critical areas:

- |                             |                        |
|-----------------------------|------------------------|
| ● Energy performance        | ● Recycling            |
| ● Environmental performance | ● Sensors and controls |
| ● Capital effectiveness     | ● Sustainable forestry |

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NICE<sup>3</sup>—National Industrial Competitiveness through Energy, Environment, and Economics: An innovative, cost-sharing program to promote energy efficiency, clean production, and economic competitiveness in industry. This grant program provides funding to state and industry partners for the first commercial demonstration of energy efficient and clean production manufacturing and industrial technologies. Total project cost for a single award must be cost-shared at a minimum of 50% by a combination of state and industrial partner dollars. The DOE share for each award shall not exceed \$500,000 to the industrial partner and up to \$25,000 to the sponsoring state agency for a maximum of \$525,000.

### PROJECT PARTNERS

AGRA-Simons  
Vancouver, BC

California Energy Commission  
Sacramento, CA

Louisiana-Pacific  
Samoa, CA

NICE<sup>3</sup> Program  
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University of Idaho  
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